

FLEAS ON RATS (*RATTUS NORVEGICUS*) IN NEW JERSEY¹

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In the spring of 1951 a survey of domestic rat parasites was started in New Jersey to determine ultimately the kinds of ectoparasites and their distribution in the state. These studies were supported in part by the New Jersey State Department of Agriculture. This paper briefly summarizes the data on fleas throughout New Jersey taken from rats (all *Rattus norvegicus*). Most of the animals were taken in garbage and refuse dumps but a portion of the animals were also taken in warehouses, stores, houses and other buildings. The place names used in the discussion do not necessarily denote that the dump is owned or operated by the municipality mentioned.

To obtain fleas and other ectoparasites, rats were captured on the dumps by driving them from their burrows with calcium cyanide or by running a bulldozer through the area and killing the rats as they emerged. As soon as killed, each animal was placed in a two quart jar containing a quart of water, and small quantities of lindane and a wetting agent. Each jar was set aside for at least 2 hours and then shaken vigorously 100 times to wash parasites from the animal. After washing the rat was removed, and the length and sex were recorded. Liquid remaining in the jar was passed through a sieve (60 meshes to the inch) to collect the parasites. Parasites and debris collected on the screen were washed from the screen and stored in 70% alcohol until mounted for study.

A preliminary report on the fleas infesting rats in New Jersey, by Hansens and Hadjinicolaou (1952), presented data on fleas taken from rats between June 1, 1951, and January 31, 1952. However, the study continued and this paper presents the data

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on fleas from rats collected between February 1, and September 30, 1952, and a summary of the entire study.

Data on the additional collections are summarized in Table 1.

At the following locations where rats were collected between February 1 and September 30, 1952, no fleas were taken (number of rats collected in parentheses): Atlantic County—Atlantic City (7), Somers Point (1); Bergen County—Englewood (18), Englewood Cliffs (1), Fairview (50), Lyndhurst (3), North Bergen (1), Rutherford (24), Woodcliff Lake (1), Wood Ridge

TABLE 1

FLEAS TAKEN FROM RATS COLLECTED FEBRUARY 1 TO SEPTEMBER 30, 1952

Location	Total Rates	Total fleas	Xenopsylla cheopis	Nosopsyllus fasciatus	Ctenocephalides felis
Secaucus	49	1	1		
Jersey City	72	30	26	4	
N. Arlington	41	6	3	3	
Union City	63	2	2		
Newark	71	5	1	4	
Rahway	39	1		1	
Perth Amboy	32	6	6		
Bernardsville	30	1			1
Bordentown	21	1			1
Flemington	34	14		14	
Camden	41	22	21	1	
Burlington	15	7		7	
Totals	508	96	60	34	2

(23); Burlington County—Pemberton (1), Palmyra (16), Riverside (29), Riverton (3), Roebling (3); Camden County—Audubon (14), Barrington (19), Pennsauken (10); Cape May County—Cape May (6), Wildwood (3), Woodbine (1); Cumberland County—Bridgeton (15), Deerfield (16), Port Norris (2), Vine-land (10); Gloucester County—Gibstown (1), National Park (7), Westville (8), Woodbury (16); Hunterdon County—High-bridge (20), Lambertville (3); Mercer County—Hightstown (30), Trenton (3), White Horse (22); Middlesex County—Cran-bury (31), North Brunswick (3), South Plainfield (1), South River (60); Monmouth County—Allentown (15), Freehold (20), Long Branch (15); Morris County—Dover (2), Pine Brook

(17); Ocean County—Toms River (1); Passaic County—Bloomingtondale (45); Salem County—Centerton (3), Pedricktown (5), Penns Grove (11), Salem (10); Somerset County—Raritan (18); Sussex County—McAfee (3), Newton (25); Union County—Elizabeth (40); Warren County—Belvidere (10), Hackettstown (43), Phillipsburg (25), Washington (33).

Between February 1 and September 30, 1952, 96 fleas were collected from a total of 1,331 rats surveyed in 69 different locations in New Jersey. Thirty-eight of these fleas were taken from rats which were trapped in buildings, and the remainder were taken from rats inhabiting dumps. Of these 38 fleas taken from rats trapped inside buildings, 27 were *Xenopsylla cheopis*, the Oriental rat flea, and these were all collected from Jersey City and Camden, New Jersey. Eleven specimens of *Nosopsyllus fasciatus* were taken from rats collected in buildings in Jersey City, Newark, and Burlington, New Jersey.

A summary of the species of fleas taken from rats in New Jersey for the entire survey is set forth in table 2.

TABLE 2

FLEAS TAKEN FROM RATS FROM MAY 15, 1951, TO SEPTEMBER 30, 1952

Flea Species	Rats infested	No. of fleas	Fleas per infested rat
<i>Xenopsylla cheopis</i>	172	376	2.2
<i>Nosopsyllus fasciatus</i>	43	59	1.3
<i>Ctenocephalides felis</i>	17	19	1.1
<i>Ceratophyllus gallinae</i>	1	2	2.0
Totals	233	456	1.9

During the two summer-study periods, most of the fleas were collected from dumps in the northeastern part of New Jersey and in Camden. Of these fleas, 86.4 percent were *Xenopsylla cheopis*, the Oriental rat flea. *Nosopsyllus fasciatus* and *Ctenocephalides felis* make up the remaining 13.6 percent of the fleas collected from rats in dumps during the summer months. The flea index was very low; 0.24 fleas per rat during the first summer and 0.04 fleas per rat collected. *X. cheopis* was taken only in those areas close to port facilities.

Preliminary studies (Hansens and Hadjinicolaou, 1952) indicated that the peak of abundance of adult fleas was reached sometime in August. This was substantiated by further studies in that 32 of the 41 fleas collected during the second summer were taken in August.

In a study of the fleas on rats in buildings, a total of 142 rats were trapped at 24 different localities. These rats yielded a total of 103 fleas of which *X. cheopis* was again the predominant species, making up 76.9 percent of the total fleas. The flea index for rats trapped in buildings was 0.73 fleas per rat. This is 5 times that of the summer index for rats in dumps and 9 times that of the outdoor winter flea index. The winter flea index was 0.08 fleas per rat collected.

SUMMARY

In a study of fleas on rats in New Jersey from May 15, 1951, to September 30, 1952, 2,721 rats (*Rattus norvegicus*) and 456 fleas were collected, giving a flea index of 0.16 fleas per rat collected. Only 233 or 8.2 percent of the rats captured were infested with fleas. Although the flea index is only 0.16 fleas per rat collected, it is of interest to note that there were almost 2 fleas per infested rat.

In all, 4 species of fleas were found to parasitize rats in New Jersey, and these were: *Xenopsylla cheopis*, *Nosopsyllus fasciatus*, *Ctenocephalides felis*, and *Ceratophyllus gallinae*. *X. cheopis* represented 82.7 percent of the fleas collected, and it was found to be present mainly in the northeastern metropolitan and Camden areas. *N. fasciatus* represented 12.9 percent of the total fleas collected and it was the major flea parasitizing rats in rural areas. The cat flea, *Ctenocephalides felis*, was collected from 12 localities and it probably only occasionally attacks rats in New Jersey. The common chicken flea, *Ceratophyllus gallinae* collected from a rat in a poultry hatchery, does not normally attack rats, and, due to the situation in which it was found, it can be considered as only accidentally occurring on rats in New Jersey.

Reference

- HANSENS, E. J. AND J. HADJINICOLAOU. 1952. Preliminary studies of fleas on rats (*Rattus norvegicus*) in New Jersey. Jour. N. Y. Ent. Soc. 60: 91-95.